

EQ:

How do waves cause coastline erosion?

What engineering solutions protect coastlines?

Today's lesson schedule

Apply your scientific understanding and skills to solve the problem.

➤ Information, baseline data gathering (control)

➤ KWL

➤ Problem

➤ Explore solutions through discussion (10 MINUTES)

➤ Design a plan on your design sheet, monitor spending.(15 MINUTES)

➤ Create your design, paying attention to cost. (30 MINUTES)

➤ Test your design. (5 MINUTES)

➤ Evaluate

➤ Presentation

Explore prior knowledge and set up a control

- Create a beach using a tin pan, water, and a sponge to simulate wave action.
- Measure your beach and ocean. Sketch the beach profile and label it, “BEACH 1”
- Create moderate waves by pushing down on the sponge, then releasing it. Observe for 2 minutes. Measure the beach and ocean, paying attention to the mark you made for the edge of your first beach. Sketch “BEACH 2”
- Now create a storm scenario with larger and faster waves. Observe for 2 minutes. Measure the beach and ocean. Sketch and label this beach “BEACH 3”

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Explain



BEACH
EROSION

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Cape Hatteras Lighthouse

Cape Hatteras Lighthouse is a
National historic Landmark and
National Register property
constructed in 1870.



Problem: Cape Hatteras Lighthouse



The Outer Banks are a group of islands on the North Carolina coast that separate the Atlantic Ocean from the North Carolina coast. The Atlantic currents here made for excellent travel for ships, except in the area of Diamond Shoals, just offshore at Cape Hatteras. Here, the warm Gulf Stream collides with the colder Labrador Current creating powerful ocean currents and shifting sand. Large numbers of ships ran aground because of these shifting sandbars, including the Ironclad Warship from the Civil War, USS Monitor. This strong tide gave this area the nickname “[Graveyard of the Atlantic](#).” It also led Congress to authorize the construction of the Cape Hatteras Lighthouse which is the tallest lighthouse in America.



Once, in 1919, the surf reached the lighthouse during a terrible storm!! Since then, scientists have watched as the pounding of the ocean waves have worn away at the land surrounding the lighthouse.

We have tried to save it from the
tides....



[view pictures of change](#)

Look at the danger this structure is facing!!! This is a National Monument!! This is a very important piece of American history!



Your mission: design a solution!

Save the Cape Hatteras Lighthouse
from the destructive processes of
the Atlantic Ocean's waves.

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Your Job

ROLE	RESPONSIBILITY
ARCHITECT	DRAWNS DESIGN, MEASURES AND RECORDS ANY DATA COLLECTED DURING TESTING, CALCULATES THE DATA (ADDING AND MULTIPLYING), UPDATES DESIGN
TREASURER	TRACKS SPENDING, WRITES CHECKS AND KEEPS ACCOUNT BALANCE, MAKES SURE SAFETY PROCEDURES ARE FOLLOWED, NOTIFIES TEACHER OF BROKEN OR MISSING MATERIAL
CONSTRUCTION ENGINEER	BUILDS THE STRUCTURE (MAY HAVE HELP FROM THE PROJECT MANAGER), CONDUCTS THE TESTS, OR ASSIGNS JOBS FOR THE TEST.
PROJECT MANAGER	MUST KEEP AN ACCURATE COUNT OF NUMBER OF WAVES DURING EACH PHASE, OBTAINS AND MANAGES BUILDING MATERIAL, MAKES SURE ALL MATERIALS ARE PROPERLY CARED FOR, MAKES SURE GROUP MEMBERS CLEAN UP AREA , IS RESPONSIBLE FOR ASKING TEACHER QUESTIONS

Tracking:

Materials/Tool Rentals	Cost Per Unit	Multiplied by	# of Units/Minutes Rental Used	Total Cost
		X		

How to calculate data

**Beach 2: 2 minutes of waves
represents _____CM erosion,
which equals _____ feet of beach
erosion each month.**

**(I pushed _____ times on the
sponge)**

RULES FOR USE OF MATERIALS:

You will be given 3 checks to purchase materials

Do not exceed your total budget of \$3,000.

Do not mistreat your materials.

You must use only the materials your team purchases.

You may not borrow, or add to the materials.

PROCESS:

Choose a name for your engineering company.

Brainstorm and create a drawing or blueprint for your solution.

Purchase the materials for your solution.

Construct your solution.

Keep your area clean.

Test your solution for 2 minutes with heavy waves.

Prepare for a brief presentation of your solution.

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